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Towards Near-Global Reconstruction and Understanding of Hydroclimate Variability and Change Over the Past Several Centuries

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Abstract We propose to develop a gridded reconstruction of past drought over Europe, North Africa, and the Middle East from a network of exactly dated annual tree-ring records covering the past several centuries to millennium. The development of this _Old World Drought Atlas‘(OWDA) will complement the existing _North American Drought Atlas‘ (NADA) and the _Monsoon Asia Drought Atlas‘ (MADA) nearly completed now as part of a National Science Foundation project on —Tree-Ring Reconstructions of Asian Monsoon Climate Dynamics‖. By developing the OWDA, we will greatly expand the coverage of gridded drought reconstructions across the Northern Hemisphere to allow for more complete synoptic-scale comparisons of hydroclimatic variability at annual-to-centennial time scales. The OWDA will prove an invaluable tool for assessing the nature and causes of climate variability and change over the last several centuries to millennium. In combination with the NADA and the MADA, it will provide near hemispheric annual reconstructions of drought severity. Currently, it is hard to assess causes of the decade to centennial changes seen in the NADA because much of North America is sensitive to both Pacific and Atlantic SST variations. By examining hemispheric patterns, and bringing in regions where the Pacific and Atlantic influences are stronger or weaker, we stand a much better chance of being able to assess how terrestrial hydroclimate change over decades and centuries links in to ocean variations. Furthermore, the OWDA, in combination with the NADA and MADA will provide invaluable information for model simulations of the climate of the last millennium whether coupled or forced by proxy-reconstructed SSTs.